Claims

What is claimed is:

1. A touch sensor, comprising:

an acoustic substrate having a surface;

an acoustic transducer; and

an acoustically diffractive grating disposed between the substrate and the transducer, the diffractive grating coupling acoustic energy within the acoustic transducer to an acoustic wave propagating along the surface of the substrate.

2. The touch sensor of claim 1, wherein the diffractive grating comprises an array of parallel elements.

3. The touch sensor of claim 2, wherein the elements have a pitch equal to the wavelength of the acoustic wave.

4. The touch sensor of claim 1, wherein the diffractive grating is structurally distinct from the transducer and substrate.

5. The touch sensor of claim 1, wherein the diffractive grating is structurally integrated with the substrate.

6. The touch sensor of claim 1, wherein the diffractive grating is structurally integrated with the transducer.

7. The touch sensor of claim 1, further comprising:

another acoustic transducer; and

another acoustically diffractive grating disposed between the substrate and the other transducer, the other diffractive grating coupling acoustic energy within the other acoustic transducer to the acoustic wave.

8. The touch sensor of claim 1, wherein the substrate surface is substantially flat.

9. The touch sensor of claim 1, wherein the transducer comprises a piezoelectric element.

10. The touch sensor of claim 1, wherein the grating comprises alternating tines and slots, and wherein the coupling between the transducer and the substrate through the tines is approximately 180 degrees out of phase with the coupling between the transducer and the substrate through the slots.

11. A touch display, comprising:

a display device;

a transparent acoustic substrate having a surface, the substrate forming a front surface of the display device;

an acoustic transducer; and

an acoustically diffractive grating disposed between the substrate and the transducer, the diffractive grating coupling acoustic energy within the acoustic transducer to an acoustic wave propagating along the surface of the substrate.

12. The touch display of claim 11, wherein the diffractive grating comprises an array of parallel elements.

13. The touch display of claim 11, wherein the elements are spaced from each other a distance equal to the wavelength of the acoustic wave.

14. The touch display of claim 11, wherein the diffractive grating is structurally distinct from the transducer and substrate.

15. The touch display of claim 11, wherein the diffractive grating is formed structurally integrated with the substrate.

16. The touch display of claim 11, wherein the diffractive grating is structurally integrated with the transducer.

17. The touch display of claim 11, further comprising:

another acoustic transducer; and

another acoustically diffractive grating disposed between the substrate and the other transducer, the other diffractive grating coupling acoustic energy within the other acoustic transducer to the acoustic wave.

18. The touch display of claim 11, wherein the substrate surface is substantially flat.

19. The touch display of claim 11, wherein the transducer comprises a piezoelectric element.

20. The touch display of claim 11, wherein the grating comprises alternating tines and slots, and wherein the coupling between the transducer and the substrate through the tines is approximately 180 degrees out of phase with the coupling between the transducer and the substrate through the slots.

21. The touch display of claim 11, wherein the display comprises a vacuum fluorescent display or a field emission display.